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TECHNICAL BULLETIN: FIELD RE-AUTOFRETTAGE PROGRAM
SPECIAL REPORT NO. 2498.02 Rev A (05/31/02)

SUBJECT: INSPECTION AND REQUALIFICATION OF SPECIFIC DOT EXEMPTION CYLINDERS (E-7277 & E-10019) WHICH WERE MANUFACTURED DURING 1998 THROUGH AUGUST OF 2000 USING THE FLOWCOAT (CLEAR RESIN EXTERIOR COATING) PROCESS.

1.0 INTRODUCTION

During the approximate timeframe - 01/98 through 08/00, cylinders manufactured by SCI's production process may have caused the fiber to slightly relax. The fiber relaxation can cause the affected cylinders to exceed the 5% permanent to total expansion ratio. **SCI has performed extensive and aggressive testing on the affected cylinders, proving this relaxation of fiber is not a safety issue and does not impact the life cycle of the cylinder.** SCI has since changed its manufacturing process, to eliminate the fiber relaxation.

SCI working in conjunction with the US Department of Transportation agreed to a field performed re-autofrettage program to re-set the compressive stresses in the affected cylinders. SCI will designate and approve various DOT certified re-test facilities to perform the re-autofrettage of the cylinders in question. The approval process can be an on-site inspection, a telephone interview or both.

2.0 DE-VALVE

Safely vent the cylinder. Refer to CGA Pamphlet C-2, "Recommendations for the Disposition of Unserviceable Compressed Gas Cylinders with Known Contents", for venting procedures.

Remove the valve using the proper tools and a holding fixture so that the cylinders exterior and valve are not damaged. Do not use a pipe wrench on the cylinder neck. Do not use heat to loosen the valve.

3.0 EXTERIOR INSPECTION

The cylinder should be clean and free from dirt and any attachment that would interfere with visual inspection. Soap and water, Windex or equivalent, may be used to remove oil and grease from the cylinder exterior.

Inspect for damage. Refer to CGA Pamphlet C-6.2.1988, "Guidelines for Visual Inspection and Requalification of Fiber Reinforced High Pressure Cylinders'.

Damage beyond Level 1 in C-6.2 is not field refurbishable. Cylinders with questionable damage should be returned to SCI for evaluation. Call SCI to obtain a return authorization number prior to returning the cylinder.

4.0 INTERIOR INSPECTION

Inspect the cylinder threads for nicks, cuts, cracks and other damage. See CGA C-6 or C-6.l.

All SCI cylinders have straight threads with 0-ring seals. Make sure the 0-ring gland is clean and free from damage. See CGA C-6.l.

Inspect the interior with a high-intensity light. Normal interior inspection procedures are found in CGA C-6 and C-6. I. Cylinders with dents visible on the interior must be condemned.

5.0 RE-AUTOFRETTAGE

The cylinders listed in Attachment 1 require re-autofrettage prior to the DOT required hydrostatic test. This procedure is to be applied only one time per cylinder in Attachment 1. All test records for the re-autofrettage and hydrotest shall be faxed to SCI at: (909) 444-4790. There are three service pressures involved in this test program. All of the cylinders were manufactured for use in Self-Contained Breathing Apparatus (SCBA).
The service pressures, test pressures and re-autofrettage pressures are:

Service Pressure (psi)	Test Pressure (psi)	Re-Autofrettage (psi)
2,216	3,693	3,878
3,000	5,000	5,250
4,500	7,500	7,875

Zero the burette/scale and observe the water/scale level/reading for 30 seconds to ensure there are no temperature variations. Apply the re-autofrettage pressure at a rate not to exceed 3,000 psi per minute. Lock off the pressure and hold for 60 seconds. Read and record the total expansion. Depressurize the cylinder and adjust the burette to bring the water level to the zero reference. No action is necessary if you using a weigh bowl and scale. Wait 30 seconds or longer if the water level in the burette is still falling or if the weigh scale reading continues to drop, when stable, read and record the permanent expansion.

NOTE: When using computer controlled test equipment, make sure that the 60 second (minimum) wait period is entered into the software. Failure to do so will often result in a false high permanent reading, because composite cylinders do not immediately return to their original shape like metal cylinders. Hold time at Zero Pressure may be extended to two (2) minutes or longer, to allow for complete contraction, prior to recording permanent expansion values.

6.0 HYDROSTATIC TESTING

SCI's composite cylinders shall be hydrostatically tested in accordance with their DOT Exemptions. The cylinders are required to be retested every three years. A maximum permanent volumetric expansion of five percent of the total expansion is allowed. There are no rejection criteria for elastic expansion.

The elastic expansion data printed on some cylinder labels is to be used as a guide to determine the proper burette size and is not the rejection criteria for elastic expansion.

Zero the burette/scale and observe the water/scale level/reading for 30 seconds to ensure there are no temperature variations. Apply the test pressure at a rate not to exceed 3,000 psi per minute. Lock off the pressure and hold for 30 seconds or longer to ensure complete expansion of the cylinder. Read and record the total expansion. Depressurize the cylinder and adjust the burette to bring the water level to the zero reference point. No action is necessary if you are using a weigh bowl and scale. Wait 30 seconds or longer if the water in the burette is falling, or if the weigh scale reading continues to drop, when stable read and record the permanent expansion.

7.0 RE-TEST MARKING

Retest dates may be steel stamped on the outer exposed surface of the aluminum cylinder neck or marked on a label securely affixed to the cylinder. SCI recommends use of an aluminum foil label as shown in Figure 1. The labels may be ordered through SCI.

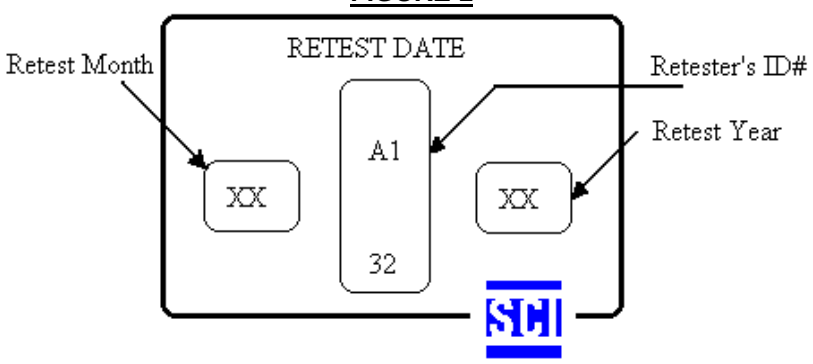
CAUTION

DO NOT ATTEMPT TO STAMP RETEST MARKINGS IN THE COMPOSITE. ANY CYLINDER WITH STAMPED MARKINGS IN THE COMPOSITE MUST BE CONDEMNED!

Title 49 CFR, Chapter 1, Paragraph 173.34(e) (6) requires as of April 15, 1986 that the retester's identification number be set between the month and year of the retest date. The retest date and retester's identification number may be typewritten or metal stamped on the foil label. For this example the retester's number is A123.

Note: The numbers are read in a clockwise manner.

FIGURE 1



The retest label is to be attached near the manufacturer label. First, clean the surface where the label is to be attached. Ammoniated water, "Windex", or equivalent window cleaner may be used. Dry the surface thoroughly before applying the label.

Mark the retest label with the month, year and retester's identification number using either a typewriter or metal stamp.

Peel the label from the paper backing. The label has a pressure sensitive adhesive surface on the back.

Apply label flat on the clean surface. Work out folds and any air pockets.

Overcoat the label and edges with a thin epoxy coating. Use any commercial epoxy glue such as Devcon 5 Minute clear epoxy or equivalent. Air dry.

8.0 RE-VALVING

Use new 0-rings compatible with the cylinder contents.

CAUTION

ONLY 0-RING MATERIALS COMPATIBLE WITH HIGH PRESSURE OXYGEN SHOULD BE USED ON CYLINDERS IN OXYGEN SERVICE.

Make sure 0-ring and cylinder gland are clean.

Make sure cylinder and valve threads are clean.

Lubricate 0-ring with a light coat of Dow Coming M-55 grease.

9.0 RE-TEST FACILITY CERTIFICATION

This procedure is only intended for and only to be used by re-test facilities designated and approved by SCI. All test data shall be faxed to SCI and SCI shall maintain a database for the re-autofrettaged cylinders. This data base would include: the model number, serial number, manufacture date, autofrettage and test pressures, expansion data from the autofrettage and test pressures, re-test date and the facility name. SCI to make this data available to the DOT upon request.

FIELD AUTOFRETTAGE PROGRAM

ATTACHMENT 1

ALT-MODEL	SERIAL NUMBER RANGE	SCI P/N	YEAR
294S	1201-1510, 1291-1306	1272100	1998
294S	1309-1334, 1611-2385	1272100	1998
294S	2386-2567, 2606-2719	1272100	1999
294S	2822-2935, 3024-3085	1272100	1999
294S	1092-1095, 2569-2605	1272100	1999
294S	2936-2953, 3086-3143	1272100	1999
294S	3144-3199, 3206-3515	1272100	1999
294S	2954-3010, 3921-4090	1272100	1999
294S	4091-6458, 6562-7396	1272100	2000
295S	1570-1701	1272101	1999
295S	2011-2040	1272101	2000
671	2351-2787, 2793-3704	1271865	1998
671	3709-4054, 4056-4230	1271865	1998
671	4236-4783, 4792-5092	1271865	1999
671	5093-5344, 4055	1271865	2000
683	015-020, 1271-1272	1272009	1999
683	020-1534, 1535-2105	1272491	1999
683	2115-2230, 2233-3144	1272491	1999
683	2231, 3145-4110	1272491	2000
684	034-166, 236-389	1272362	1998
684	167-235, 390-1159	1272362	1999
684	1208-1599	1272362	1999
684	1600-1643	1272362	2000
685	029-408	1272437	1998
685	409-915, 937-1705	1272437	1999
685	1706-2249, 2440-2503	1272437	2000
708	010-985	1272107	1998
708	986-1232, 1236-2587	1272107	1999
708	2588-5799	1272107	2000